them in cloſe vessels, which he called digesters, ſo as to acquire a great degree of heat. For it must be ob­ſerved in this place, that it had been diſcovered long before (in 1684) by Dr Hooke, the moſt inquiſitive experimental philosopher of that inquiſitive age, that water could not be made to acquire above a certain temperature in the open air ; and that as ſoon as it be­gins to boil, its temperature remains fixed, and an increaſe of heat only produces a more violent ebullition, and a more rapid waste. But Papin’s experiments made the elaſtic power of ſteam very familiar to him : and when he left England and settled as profeſſor of mathe­matics at Marpurgh, he made many awkward attempts to employ this force in mechanics, and even for raising water. It appears that he had made experiments with this view in 1698, by order of Charles Landgrave of Heſſe. For this reaſon the French affect to consider him as the inventor of the ſteam-engine. He indeed publiſhed ſome account of his invention in 1707; but he acknowledges that Captain Savary had alſo, and without any communication with him, invented the ſame thing. Whoever will take the trouble of looking at the deſcription which he has given of theſe inven­tions, which are to be ſeen in the *Acta Eruditorum, Lipsiae,* and in Leupold’s *Theatrum Machinarum,* will see that they are most awkward, abſurd, and impracti­cable. His conceptions of natural operations were al­ways vague and imperfect, and he was neither philoſopher nor mechanician.

We are thus anxious about the claim of thoſe gentle­men, becauſe a moſt reſpectable French author, Mr Boſſut, ſays in his *Hydrodynamique,* that the firſt notion of the ſteam-engine was *certainly* owing to Dr Papin, who had not only invented the digester, but had in 1695 published a little performance deſcribing a machine for railing water, in which the piſtons are moved by the vapour of boiling water alternately dilated and condenſed. Now the fact is that Papin’s firſt publication was in 1707, and his piſton is nothing more than a floater on the ſurface of the water, to prevent the watte of ſteam by condenſation ; and the return of the piſton is not produced, as in the ſteam-engine, by the condenſa­tion of the ſteam, but by admitting the air and a co­lumn of water to press it back into its place. The whole contrivance is ſo awkward, and ſo unlike any diſtinct notions of the ſubject, that it cannot do credit to any perſon. We may add, that much about the ſame time Mr Amontons contrived a very ingenious but intricate machine, which he called a *fire-wheel.* It conſiſted of a number of buckets placed in the circum­ference of a wheel, and communicating with each other by very intricate circuitous passages. One part of this circumference was expoſed to the heat of a furnace, and another to a ſtream or cittern of cold water. The communications were ſo diſpoſed, that the ſteam pro­duced in the buckets on one side of the wheel drove the water into buckets on the other side, ſo that one side of the wheel was always much heavier than the other ; and it must, therefore turn round, and may ex­ecute ſome work. The death of the inventor, and the intricacy oſ the machine, cauſed it to be neglected. Another member of the Parisian academy of ſciences (Mr Deſlandes) alſo preſented to the academy a project of a ſteam-wheel, where the impulſive force of the va­pour was employed; but it met with no encouragement.

The Engliſh engineers had by this time ſo much im­proved Savary’s firſt invention, that it supplies all others. We have therefore no heſitation in honour of the firſt and complete invention to the quis of Worceſter ; and we are not diſpoſe . Captain Savary’s claim to originality as to tion of the machine, and even think it probably his own experiments made him ſee the whole indepen­dent of the marquis’s account.

Captain Savary’s engine, as improved and simplified by himſelf, is as follows.

A (fig. 6.) repreſents a ſtrong copper boiler proper­ly built up in a furnace. There proceeds from its top a large ſteam-pipe B, which enters into the top of an­other ſtrong veſſel R called the receiver. This pipe has a cock at C called the steam-cock. In the bot­tom of the receiver is a pipe F, which communicates ſidewiſe with the rising pipe KGH. The lower end H of this pipe is immerſed in the water of the pit or well, and its upper part K opens into the cittern into which the water is to be delivered. Immediately be­low the pipe of communication F there is a valve G, opening when preſſed from below, and ſhutting when preſſed downwards. A ſimilar valve is placed at I, immediately above the pipe of communication. Laſtly, there is a pipe ED which branches off from the rising pipe, and enters into the top of the receiver. This pipe has a cock D called the injection-cock. The mouth of the pipe ED has a nozzle f pierced with ſmall holes, pointing from a centre in every direction. The keys of the two cocks C and D are united, and the handle *gh* is called the regulator.

Let the regulator be ſo placed that the ſteam-cock C is open and the injection-cock D is ſhut ; put water in­to the boiler A, and make it boil ſtrongly. The ſteam coming from it will enter the receiver, and gradually warm it, much ſteam being condenſed in producing this effect. When it has been warmed ſo as to condenſe no more, the ſteam proceeds into the rising pipe ; the valve G remains ſhut by its weight ; the ſteam lifts the valve I, and gets into the rising pipe, and gradually warms it. When the workman feels this to be the caſe, or hears the rattling of the valve I, he immediately turns the ſteam-cock ſo as to ſhut it, the injection-cock ſtill remaining ſhut (at leaſt we may ſuppoſe this for the preſent). The apparatus must now cool, and the ſteam in the receiver collapſes into water. There is nothing now to balance the preſſure of the atmoſphere ; the valve I remains ſhut by its weight ; but the air incum­bent on the water in the pit preſſes up this water through the ſuction-pipe H G, and cauſes it to lift the valve G, and flow into the receiver R, and fill it to the top, if not more than 20 or 25 feet above the ſurface of the pit water.

The ſteam-cock is now opened. The ſteam which, during the cooling of the receiver, has been accumula­ting in the boiler, and acquiring a great elasticity by the action of the fire, now ruſhes in with great violence, and, preſſing on the ſurface of the water in the receiver, cauſes it to ſhut the valve G and open the valve I by its weight alone, and it now flows into the rising pipe, and would stand on a level if the elaſticity of the ſteam were no more than what would balance the atmoſpherical preſſure. But it is much more than this, and therefore is *presses* the water out of the receiver into the rising